

Comments on nomenclature of the order *Rhododendro tomentos-Laricetalia gmelinii* and validation of the alliance *Pino sibiricae-Laricion sibiricae*

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Academic editor: Federico Fernández-González

Received 24 April 2024 ♦ **Accepted** 12 August 2024 ♦ **Published** 30 September 2024

Abstract

Zonal light-coniferous forests are widespread on long-frozen soils in Southern Siberia. Their individuality was first recognised in 1982 by Guinochet, who proposed a new suballiance for them, *Pino-Laricenion sibiricae*, within the alliance *Vaccinio-Piceion*. Later, attempts were made to raise the suballiance to the rank of an alliance. However, they failed to publish the name *Pino sibiricae-Laricion sibiricae* validly according to the International Code of Phytosociological Nomenclature (ICPN). Therefore, the name is validated here after discussing the reasons for rejecting all previous proposals. The validity of the corrected and mutated syntaxon names *Rhododendro tomentos-Laricetalia gmelinii* and *Rhododendro tomentos-Laricion gmelinii*, which are related to the alliance *Pino sibiricae-Laricion sibiricae*, is confirmed. Corrections and mutations of two association names are also performed.

Taxonomic reference: World Flora Online Plant List (WFO) (<https://wfoplantlist.org/>) [accessed 28 July 2024].

Abbreviations: ICPN = International Code of Phytosociological Nomenclature (Theurillat et al. 2021); WFO = World Flora Online Plant List.

Keywords

boreal, forest, *Ledo-Laricetalia*, nomenclature, phytosociology, Siberia, *Vaccinio-Piceetea*

Introduction

The alliance name '*Pino sibiricae-Laricion sibiricae*' is related to a peculiar regional category of light-coniferous forests occurring on long-frozen soils in the southern part of Siberia and adjacent areas of Northern Mongolia (Ermakov et al. 2002; Ermakov 2019, 2023). The syntaxon

was proposed by Guinochet (1982) as a suballiance under the invalid name '*Pino-Laricenion sibiricae*' after analyzing two new associations made by him in the Eastern Sayan mountains. The detailed history describing the raise of the suballiance to the rank of an alliance under the name '*Pino sibiricae-Laricion sibiricae*' has been discussed by Anenkhonov (2023) in this journal. According

to Anenkhonov, the name '*Pino sibiricae-Laricion sibiricae* Guinochet ex Dostálek et al. 1988' is the correct name of the alliance. The aims of our work are (1) to present arguments on the invalidity of all previous attempts to describe the alliance name *Pino sibiricae-Laricion sibiricae*, and (2) to validate the name *Pino sibiricae-Laricion sibiricae* in accordance with the ICPN.

On the nomenclature of the name *Pino sibiricae-Laricion sibiricae* and names of related syntaxa

Guinochet (1982) extended the range of the alliance *Vaccinio-Piceion* Braun-Blanquet in Braun-Blanquet, Sissingh et Vlieger 1939 in Siberia eastwards with two new associations, the '*Rhododendro-Pinetum sibiricae* Guinochet' and the '*Piceo obovatae-Abietetum sibiricae* Guinochet', within the new suballiance '*Pino-Laricion* Guinochet'. However, the name '*Rhododendro-Pinetum sibiricae*' (p. 296 and relevés 1 and 2 in table 1) is invalidly published because no type relevé was designated (Art. 5a) and also because it is not clear which species of *Rhododendron* is the name-giving taxon since *R. dauricum* occurs in both relevés and *R. aureum* occurs in relevé 2 (Art. 3g). In the same way, the name '*Piceo obovatae-Abietetum sibiricae*' (p. 296 and relevés 3 and 4 in table 1) was invalidly published because no type relevé was designated (Art. 5a). Consequently, the name '*Pino-Laricion*' (p. 296 and table 1) was also invalidly published because the diagnosis contained only two invalidly published associations ('*Rhododendro-Pinetum sibiricae* Guinochet 1982' nom. inval. and '*Piceo obovatae-Abietetum sibiricae* Guinochet 1982' nom. inval.).

In their study of some North Korean *Rhododendron* species, Dostálek et al. (1988) described on p. 33 the new association '*Rhododendro aurei-Laricetum oligensis*', which they attributed to the '*Pino-Laricion*' of Guinochet (1982). However, they considered that the communities of East Siberian larch woodlands did not correspond to a suballiance but to a vicariant alliance of the '*Piceion excelsae* Pawłowski in Pawłowski, Sokołowski et Wallisch 1928'. Consequently, they raised Guinochet's suballiance to alliance level, using the name '*Pino sibiricae-Laricion sibiricae* (Guinochet 1982) Dostálek, J. Dostálek, Mucina et Ho-Dzun 1988' [recte: *Pino sibiricae-Laricion sibiricae* Dostálek, J. Dostálek, Mucina et Ho-Dzun 1988]. They also attempted to validate the invalid '*Rhododendro-Pinetum sibiricae*' published by Guinochet by selecting a type from Guinochet's two relevés. However, despite the designation of a type (as "lectotypus") and an unambiguous reference (Art. 2b, Note 4) to Guinochet (1982), the name '*Rhododendro-Pinetum sibiricae* Guinochet ex Dostálek in Dostálek, J. Dostálek, Mucina et Ho-Dzun 1988' was still not validly published in Dostálek et al. (1988) because it is still not

clear which species, *Rhododendron dauricum* or *R. aureum*, is the name-giving taxon (Art. 3g). Consequently, the name '*Pino sibiricae-Laricion sibiricae* Dostálek, J. Dostálek, Mucina et Ho-Dzun 1988' is invalidly published in Dostálek et al. (1988) because the name '*Rhododendro-Pinetum sibiricae*', which they designated as its type association, is not validly published.

In their paper on modelling the distribution of the forests in the southern part of the mountains of the Western Sayan (Southern Siberia), Ermakov and Alsynbayev (2004) provided a syntaxonomic scheme for this region and described a new order, two new alliances and one new association. The association was named '*Carici iljinii-Laricetum sibiricae*', and it was validly published on pp. 701–702, although the Latin word "typus" was not used to designate the type relevé, which was designated with the Russian word "Номенклатурный тип" ("nomenclatural type", in the sense of the holotype). However, for a name published on or after 1 January 2002 and before 1 January 2021, the single relevé published on p. 701 for the association, being the only suitable element for the typification, automatically became the holotype (Art. 5a, Ex. 5). Among the two new alliances, the '*Ledo palustris-Laricion cajanderi* Ermakov' was validly published on p. 701 because (1) the diagnosis of the alliance contains only a single association, the '*Ledo palustris-Laricetum cajanderi* Ermakov, Cherosov et Gogoleva 2002' that is designated as the nomenclatural type (in Russian: "Номенклатурный тип") (Art. 5a), (2) there is an unambiguous reference (Art. 2b Note 4) to Ermakov et al. (2002) where the name is validly published on p. 82 with a single relevé designated as the "nomenclatural type" (Art. 5a), which contains the two name-giving taxa *Ledum palustre* L. and *Larix cajanderi* Mayr (Art. 3g); and (3) this relevé also contains three of the seven diagnostic species indicated for the alliance. Ermakov (2023) erroneously considered the name '*Ledo palustris-Laricion cajanderi*' to have been invalidly published in Ermakov and Alsynbayev (2004) (see below).

In contrast, the name of the new alliance '*Pino sibiricae-Laricion sibiricae* Ermakov' was not validly published on p. 701 although in the original diagnosis there was only one suitable element designated as the nomenclatural type ("Номенклатурный тип", in Russian) (Art. 5a), namely the validly published association '*Carici iljinii-Laricetum sibiricae* Ermakov in Ermakov et Alsynbayev 2004'. The invalidity is due to the fact that the same association is also the type of another new alliance name on p. 701, the '*Ledo-Laricion sibiricae*'. Actually, the name '*Ledo-Laricion sibiricae*' is a typing error for '*Pino-Laricion sibiricae*' since the '*Carici iljinii-Laricetum sibiricae*' is indeed the type designated for the '*Pino-Laricion sibiricae*'. Nevertheless, although no type was designated for the name '*Ledo-Laricion sibiricae*', its diagnosis contains only one suitable element to be designated as the type of the name, the '*Carici iljinii-Laricetum sibiricae*'. Indeed, the names of the two other associations mentioned ('*Ledo-Laricetum sibiricae* Zhitlukhina et Alimbekova 1987' and '*Bergenio-Pinetum sibiricae* Zhitlukhina et Alimbekova 1987') are

not effectively published names (nomina inedita) since in the bibliography of Ermakov and Alsynbayev (2004) all the references to Zhitlukhina and/ or Alimbekova published in 1987, namely references 6, 7 and 8, correspond to VINITI papers, which are not qualified as effective publications (Art. 1). Therefore, although the name '*Ledo-Laricion sibiricae*' appeared as technical error, it is validly published (Art. 5a). As a result, the two names '*Pino sibiricae-Laricion sibiricae*' and '*Ledo-Laricion sibiricae*', having the same type, are homotypic synonyms published at the same time and implicitly correspond to alternative names (Def. VI), which are invalidly published on or after 1 January 2002 (Art. 3j).

Regarding the new order proposed to represent the light-coniferous larch (*Larix cajanderi*) forests occurring on frozen soils in Central Yakutia, the name '*Ledo palustris-Laricetalia cajanderi*' was validly published in Ermakov and Alsynbayev (2004) because its original diagnosis contains only one suitable alliance, the new, validly published '*Ledo palustris-Laricion cajanderi* Ermakov', which was designated as the type, even if the Latin word "typus" was not used (Art. 5a). Indeed, the two other alliances '*Pino sibiricae-Laricion sibiricae*' and '*Ledo-Laricion sibiricae*' included in the order being invalid, the '*Ledo palustris-Laricion cajanderi* Ermakov in Ermakov et Alsynbayev 2004' remains the only suitable element in the diagnosis of the order name, and two species (*Ledum palustre* L. and *Vaccinium uliginosum*) among the eleven diagnostic species indicated for the order (Art. 8) occur in the single relevé of the unique association validly published for the order, the '*Ledo palustris-Laricetum cajanderi*'. However, Ermakov (2023) erroneously considered the name '*Ledo palustris-Laricetalia cajanderi*' to have been invalidly published in Ermakov and Alsynbayev 2004 (see below).

Later, Ermakov (2019, 2023) suggested that the two names '*Pino sibiricae-Laricion sibiricae* Guinochet ex Dostálek et al. 1988' and '*Rhododendro-Pinetum sibiricae* Guinochet 1982' are both invalid and nomina dubia. As seen above, these names are indeed invalid, but not for the reasons given by Ermakov, who rejected the latter association name as nomen dubium (Art. 37) on the grounds that it was described on two floristically incomplete relevés. In fact, the values given for the cover of the moss layer of these relevés are 90% and 100%, respectively, but no bryophyte species are mentioned, which makes it impossible to correctly identify the association. However, the syntaxonomic content has no influence on the validity of a name, which depends only on objective formal requisites (articles 2 through 9, see Def. IV). In addition, a nomen dubium can only be designated by a decision of the GPN Assembly (Art. 37).

In his overview of the order '*Ledo palustris-Laricetalia cajanderi*', Ermakov (2023) superfluously re-published the alliance and the order names '*Ledo palustris-Laricion cajanderi*' and '*Ledo palustris-Laricetalia cajanderi*', respectively, because he considered them invalidly published in Ermakov and Alsynbayev (2004). Therefore, the validly published name '*Ledo palustris-Laricion cajanderi* Erma-

kov 2023' with the association '*Ledo palustris-Laricetum cajanderi* Ermakov, Cherosov et Gogolova 2002' as its holotype is a later superfluous name (Art. 29c). For the order '*Ledo palustris-Laricetalia cajanderi*', the erroneous reason given in Ermakov (2023) for its invalidity in Ermakov and Alsynbayev (2004) was that its type, the alliance '*Ledo palustris-Laricion cajanderi*', was invalidly published, which was not the case as shown above. Therefore, the validly published name '*Ledo palustris-Laricetalia cajanderi* Ermakov 2023' is also a later superfluous name (Art. 29c).

Anenkhonov (2023) considered on p. 319 the name '*Rhododendro-Pinetum sibiricae*' as validly published in Dostálek et al. (1988). Contrary to the author's assertion this is not the case under Art. 3g (see above). In addition, the correct citation of the name in accordance with Rec. 10C and 46D is not '*Rhododendro dahurici-Pinetum sibiricae* Guinochet ex Dostálek in Dostálek, J. Dostálek, Mucina et Ho-Dzun 1988', as indicated on p. 320, "because *Rhododendron dahuricum* is the only *Rhododendron* species present in the type relevé designated by Dostálek et al. (1988)" (namely relevé 1, table 1 in Guinochet 1982). In fact, as seen above, in their attempt to validate the '*Rhododendro-Pinetum sibiricae*' of Guinochet (1982), Dostálek et al. (1988) implicitly accepted the whole diagnosis of Guinochet for the name, i.e. relevés 1 and 2 in table 1, with *R. dauricum* occurring in both relevés and *R. aureum* in relevé 2 (Art. 3g). Consequently, the name '*Pino sibiricae-Laricion sibiricae*' was invalidly published in Dostálek et al. (1988) because of the invalidity of the type association, the '*Rhododendro-Pinetum sibiricae*' (Arts. 5a, 17). Contrary to Ermakov (2019, 2023), Anenkhonov (2023) did not consider the '*Rhododendro-Pinetum sibiricae*' to be a nomen dubium because relevé 1 in table 1 in Guinochet (1982), selected as the type of the association name, can be easily classified at the class, order and even alliance level just by the vascular plant species. Although bryophytes are physiognomically important in boreal coniferous forests, they are not good diagnostic species at the association level due to their ubiquity. Therefore, their absence is not a reason to consider Guinochet's relevé incomplete for an association-level classification.

Validation of the name *Pino sibiricae-Laricion sibiricae* and other nomenclatural novelties

Following the nomenclatural analysis performed above, we validate here the name *Pino sibiricae-Laricion sibiricae* Ermakov et Theurillat all. nov. The holotypus of the alliance is the association *Carici iljinii-Laricetum sibiricae* Ermakov in Ermakov et Alsynbayev 2004 (Ermakov and Alsynbayev 2004, pages 701–702). The diagnostic species of the alliance are *Pinus sibirica*, *Calamagrostis obtusata*, *Carex iljinii*, *Luzula parviflora* and *Poa sibirica*.

The alliance includes the larch and pine-larch (*Pinus sibirica*, *Larix sibirica*) forests widespread in the upper part

of the forest belt in the continental and ultra-continental climatic sectors of Southern Siberia and adjacent areas of Northern Mongolia, where they occupy north-facing mountain slopes at altitudes of 1400–2000 m a.s.l. At present, the alliance *Pino sibiricae-Laricion sibiricae* includes nine associations described in Anenkhonov and Chytrý (1997), Ermakov and Alsynbayev (2004), Ermakov and Makhatkov (2011), Makunina (2011, 2020), Ermakov (2014), and Ermakov and Polyakova (2022).

The names ‘*Rhododendro-Pinetum sibiricae* Guinochet 1982’ and ‘*Piceo-Abietetum sibiricae* Guinochet 1982’ are not validated here. The reason is that the former name is floristically very close to the validly published association *Bergenia crassifoliae-Laricetum sibiricae* Makunina 2011, of which it can be considered a synonym. It is also close to the associations *Vaccinio uliginosi-Laricetum sibiricae* Makunina 2020 and *Linnaeo borealis-Pinetum sibiricae* Ermakov et Polyakova 2022. As far as the ‘*Piceo-Abietetum sibiricae*’ is concerned, we do not validate the name here because the association cannot be placed in the order *Rhododendro-Laricetalia* (= *Ledo-Laricetalia*, see below).

Ledum palustre L. 1753, the name-giving taxon of the order *Ledo palustris-Laricetalia cajanderi* Ermakov et Alsynbayev 2004 (Ermakov and Alsynbayev 2004, p. 700, 701), is now considered to belong to the genus *Rhododendron* as *R. tomentosum* Harnja 1990 in several floras (e.g., Euro+Med Plant Base,

<https://euoplusmed.org>; WFO; Flora of North America, <http://beta.floranorthamerica.org>; Flora Germanica, Hassler and Muer 2022). In addition, *Larix gmelinii* (Ruprecht) Kuzeneva 1920 and *Larix cajanderi* Mayr 1906 are considered the same taxon (e.g., in WFO; GBIF, <https://www.gbif.org>; The Gymnosperm Database, <https://www.conifers.org>), and the former is the correct name at the species rank (basonym: *Abies gmelinii* Ruprecht 1845). Therefore, in accordance with Art. 45, we mutate the order name with *Rhododendron tomentosum* instead of *Ledum palustre* and, in accordance with Art. 44, we correct it with *Larix gmelinii* instead of *L. cajanderi*, namely *Rhododendro tomentosi-Laricetalia gmelinii* Ermakov et Alsynbayev 2004 nom. corr. et mut. nov. In the same way, we mutate and correct the alliance name *Ledo palustris-Laricion cajanderi* Ermakov in Ermakov et Alsynbayev 2004 (Ermakov and Alsynbayev 2004, p. 701) to *Rhododendro tomentosi-Laricion gmelinii* Ermakov in Ermakov et Alsynbayev 2004 nom. corr. et mut. nov., and we also mutate and correct two association names, *Ledo palustris-Pinetum sibiricae* Ermakov et Makhatkov 2011 (Ermakov and Makhatkov 2011, p. 202) to *Rhododendro tomentosi-Pinetum sibiricae* Ermakov et Makhatkov 2011 nom. mut. nov., and *Ledo palustris-Laricetum cajanderi* Ermakov, Cherosov et Gogoleva 2002 (Ermakov et al. 2002, p. 440) to *Rhododendro tomentosi-Laricetum gmelinii* Ermakov, Cherosov et Gogoleva 2002 nom. corr. et mut. nov.



Figure 1. Boreal forests of larch (*Larix sibirica*) and pine (*Pinus sibirica*) of the association *Carici iljinii-Laricetum sibiricae* Ermakov in Ermakov et Alsynbayev 2004 (alliance *Pino sibiricae-Laricion sibiricae* Ermakov et Theurillat all. nov.) from the Eastern Altai (Southern Siberia).

Syntaxonomic synopsis

Cl. *Vaccinio-Piceetea* Braun-Blanquet in Braun-Blanquet, Sissingh et Vlieger 1939

Ord. *Rhododendro tomentos-Laricetalia gmelinii* Ermakov in Ermakov et Alsynbayev 2004 nom. corr. et mut. nov. (Art. 44 and alternative form of the name, Art. 45)
Synonyms: *Ledo palustris-Laricetalia gmelinii* Ermakov et Alsynbayev 2004 nom. corr.; *Ledo palustris-Laricetalia cajanderi* Ermakov et Alsynbayev 2004 nom. inept. (Art. 44); *Ledo palustris-Laricetalia cajanderi* Ermakov 2023 (Art. 29c)

All. *Pino sibiricae-Laricion sibiricae* Ermakov et Theurillat all. nov.

Synonyms: *Pino-Laricenion* Guinochet 1982 nom. inval. (Art. 5; corresponding name); *Pino sibiricae-Laricion sibiricae* Dostálek, J. Dostálek, Mucina et Ho-Dzun 1988 nom. inval. (Art. 5); *Pino sibiricae-Laricion sibiricae* Ermakov in Ermakov et Alsynbayev 2004 nom. inval. (Art. 3j)

Ass. *Carici iljinii-Laricetum sibiricae* Ermakov in Ermakov et Alsynbayev 2004

Ass. *Carici iljinii-Pinetum sibiricae* Ermakov 2014

Ass. *Calamagrostio obtusatae-Laricetum sibiricae* Chytrý, Anenkhonov et Valachovic in Anenkhonov et Chytrý 1998

Ass. *Melampyro pratensis-Laricetum sibiricae* Ermakov et Makhatkov 2011

Ass. *Rhododendro tomentos-Pinetum sibiricae* Ermakov et Makhatkov 2011 nom. mut. nov. (alternative form of the name, Art. 45)

Synonym: *Ledo palustris-Pinetum sibiricae* Ermakov et Makhatkov 2011

Ass. *Bergenio crassifoliae-Laricetum sibiricae* Makunina 2011

Synonyms: *Rhododendro-Laricetum sibiricae* Guinochet 1982 nom. inval. (Art. 3g, 5a); *Bergenio-Pinetum sibiricae* Zhitlukhina et Alimbekova 1987 nom. inval. (Art. 1)

Ass. *Vaccinio uliginosi-Laricetum sibiricae* Makunina 2020

Ass. *Carici globularis-Pinetum sibiricae* Ermakov et Polyakova 2022

Ass. *Linnaeo borealis-Pinetum sibiricae* Ermakov et Polyakova 2022

All. *Rhododendro tomentos-Laricion gmelinii* Ermakov in Ermakov et Alsynbayev 2004 nom. corr. et mut. nov. (Art. 44 and alternative form of the name, Art. 45)

Synonyms: *Ledo palustris-Laricion gmelinii* Ermakov in Ermakov et Alsynbayev 2004 nom. corr.; *Ledo palustris-Laricion cajanderi* Ermakov in Ermakov et Alsynbayev 2004 nom. inept. (Art. 44); *Ledo palustris-Laricion cajanderi* Ermakov 2023 (Art. 29c)

Rhododendro tomentos-Laricetum gmelinii Ermakov, Cherosov et Gogoleva 2002 nom. corr. et. mut. nov. (Art. 44 and alternative form of the name, Art. 45)

Synonyms: *Ledo palustris-Laricetum gmelinii* Ermakov, Cherosov et Gogoleva 2002 nom. corr.; *Ledo palustris-Laricetum cajanderi* Ermakov, Cherosov et Gogoleva 2002 nom. inept. (Art. 44)

Conclusion

The name *Pino sibiricae-Laricion sibiricae* was not validly published either in Dostálek et al. (1988) (Art. 5) or in Ermakov and Alsynbayev (2004) (Art. 3j). It is validated in the present paper as *Pino sibiricae-Laricion sibiricae* Ermakov et Theurillat all. nov., together with the correction and/or mutation of other syntaxon names of Siberian forests.

Author contributions

NE planned the research and performed the syntaxonomic analysis; JPT did the nomenclature analysis. Both authors contributed critically to the writing of the paper.

Acknowledgements

The study was supported by the Ministry of Science and Higher Education of the Russian Federation (project FZRG-2024-0012 “Fundamental patterns of phyto-diversity and ecological features of mountain forests of southern Russia”). We thank Nicolas Fumeaux for his nomenclatural advice on some plant names, Federico Fernández-González, Wolfgang Willner, Idoia Biurrun and an anonymous reviewer for their valuable remarks.

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